

Patent claims

1. A laser diode with a vertical resonator, characterized by  
a means for shaping the beam profile of the laser diode, the  
5 means having at least one decoloring absorber means (5) in the  
vertical resonator.

2. The laser diode as claimed in claim 1, characterized by at  
least one pn junction of III-V or II-VI compound semiconductor  
10 material.

3. The laser diode as claimed in claim 1 or 2, characterized  
in that at least one absorber means (5) is monolithically  
integrated into a series of layers.  
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4. The laser diode as claimed in claim 3, characterized in  
that at least one absorber means (5) is arranged in the Fabry-  
Perot resonator of the series of layers.

20 5. The laser diode as claimed in at least one of the  
preceding claims, characterized in that at least one absorber  
means (5) is arranged outside the depletion zone of the pn  
junction.

25 6. The laser diode as claimed in at least one of the  
preceding claims, characterized in that at least one absorber  
means (5) is formed as a layer in the vertical resonator, the  
thickness of the layer being small, approaching a quarter of  
the material wavelength.  
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7. The laser diode as claimed in at least one of the  
preceding claims, characterized in that at least one absorber  
means (5) is formed as a layer with the thickness of the layer  
being greater than a quarter of the material wavelength.

8. The laser diode as claimed in at least one of the preceding claims, characterized in that at least one absorber means (5) has a means for current constriction, in particular by a combination of the medium of the absorber means with an oxide aperture or proton implantation.

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9. The laser diode as claimed in at least one of the preceding claims, characterized by two electrical supply leads, one for the p contact and one for the n contact.

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10. The laser diode as claimed at least one of the preceding claims, characterized by a current constricting means (53) in the vertical resonator.

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11. The laser diode as claimed in at least one of the preceding claims, characterized in that at least one reflector layer (2, 6) has a relief structure, in particular a Fresnel lens, to improve the mode selection.

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12. The laser diode as claimed in at least one of the preceding claims, characterized in that at least one spacer layer is arranged in the vertical resonator, in particular between the absorber layer 50 and the active zone 4.

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13. The laser diode as claimed in at least one of the preceding claims, characterized in that at least one layer of the vertical resonator consists of GaAsN or InGaSbP.

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14. An optical system, in particular a CD player or a data transmission system, with at least one laser diode as claimed in at least one of claims 1 to 13.